

CEMP-RA

DEPARTMENT OF THE ARMY  
U.S. Army Corps of Engineers  
Washington, DC 20314-1000

EM-1110-1-4011

Manual  
No. 1110-1-4011

1 October 1999

Engineering and Design  
**CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN  
REQUIREMENTS FOR HAZARDOUS WASTE LANDFILLS**

**1. Purpose.** This engineer manual transmits a document which describes CQA inspection requirements for hazardous waste landfill covers and liners. The appendix of this document is a template for landfill CQA plans to assist designers in incorporating the important aspects of CQA. The document may also be used in reviewing CQA plans developed by others.

**2. Applicability.** This manual applies to HQUSACE elements, major subordinate commands, districts, laboratories, and field operating activities (FOA) who have responsibility for preparing or reviewing CQA plans for landfills.

**3. Distribution Statement.** Approved for public release, distribution is unlimited

**4. References.** The following references provide additional information on CQA for landfills:

4.1 Quality Assurance Representatives Guide, EP 415-1-161 Volume 5, United States Army Corps of Engineers, July 1997; and

4.2 Quality Assurance and Quality Control for Waste Containment Facilities, Technical Guidance, EPA/6001R-93/182, Environmental Protection Agency, September 1993.

**5. Discussion.**

The federally mandated requirements for the components of a hazardous waste landfill are described in the Code of Federal Regulations (CFR) 40 CFR 264. State and local government agencies also have criteria for landfill systems and, in some instances, these criteria may be more stringent than federal guidelines. In general, the components of landfill covers and liners consist of protective cover soil layers, drainage layers, and low permeability layers. Many landfill covers also contain some type of gas control system. Drainage layers and low permeability layers are frequently constructed of geosynthetics. The term geosynthetic refers to plastic manufactured materials such as geotextiles, geomembranes, geonets, geogrids, and geocomposites.

The responsibilities of the CQA inspector are similar regardless of the regulatory criteria under which a landfill is being designed and constructed. The CQA inspector must verify that all soil layers, geosynthetic layers, and appurtenances are constructed in accordance with the plans and specifications. USACE personnel have traditionally performed CQA inspection duties on USACE

**1 Oct 99**

construction projects. However, at some landfill sites, a third party CQA inspector has been hired to observe the construction of some or all of the landfill. This has been done because of the amount of documentation required and the unique CQA inspection requirements involved with the construction of geosynthetic layers in landfills.

The attached standard CQA plan can be used as a tool in defining the responsibilities of a third party CQA inspector. It can also be used if USACE inspectors will be responsible for all CQA activities. However, manpower limitations may prevent USACE inspectors from performing all of the CQA duties outlined in this standard plan. The amount of documentation required by this plan is extensive and may be reduced on a site specific basis, depending on regulatory requirements. The designer should contact the regulatory authorities to determine what CQA documentation they require.


The strict CQA requirements for landfills requires coordination between the designer and field offices to determine manpower needs and to determine how much work can be performed by USACE inspectors. Work that cannot be performed by USACE inspectors will have to be performed by a third party inspector. Funds needed to perform CQA on landfills will also be greater than for most other types of construction projects. Because of this, finding needs for CQA should be addressed during design and coordinated with the field office.

**6. Actions Required.** The topics listed in this document should be considered in the preparation of a CQA plan for any landfill constructed by the USACE. It is strongly recommended that input be sought from the appropriate regulatory and in-house technical staff in the preparation of any CQA plan for a landfill. The involvement of in-house technical expertise is essential to providing a cost-effective, high quality service to the customer.

**7. Format.** This manual provides a template for a standard CQA plan for hazardous waste landfills. The standard CQA plan is presented in Appendix A and is divided into sections with each section covering a unique aspect of CQA for landfill construction. The standard CQA plan must be modified on a site specific basis. Sections which are not applicable should be deleted. Applicable sections should be edited to meet the site specific needs of a project. Notes to the designer are also provided within the text of the standard CQA plan to provide guidance on how to edit the document.

FOR THE COMMANDER:

1 Appendix  
APP A Construction Quality Assurance  
(CQA) Plan Requirements for Hazardous  
Waste Landfills



RUSSELL L. FUHRMAN  
Major General, USA  
Chief of Staff